REMARKS

This paper is responsive to a Non-Final Office action dated July 6, 2005. Claims 1-41 were examined. Claim 12 has been amended for clarity. Claim 34 has been amended to remove the term "wireless" from the claim. Applicant requests an interview.

Rejections under 35 U.S.C. §101

Claims 1-34 are rejected under 35 U.S.C. 101 as because the Office characterizes the claim language as being directed to an abstract idea not tied to a technological art that results in a concrete, useful, and tangible result. Applicant's claims 1 – 32 are statutory process claims that fall within the category of computer-related processes limited to a practical application in the technological arts. MPEP §2106 B(1)(a) states

> For such subject matter to be statutory, the claimed process must be limited to a practical application of the abstract idea or mathematical algorithm in the technological arts. See *Alappat*, 33 F.3d at 1543, 31 USPQ2d at 1556-57 (quoting *Diamond v. Diehr*, 450 U.S. at 192, 209 USPQ at 10). See also *Alappat* 33 F.3d at 1569, 31 USPQ2d at 1578-79 (Newman, J., concurring) ("unpatentability of the principle does not defeat patentability of its practical applications") (citing *O'Reilly v. Morse*, 56 U.S. (15 How.) at 114-19). A claim is limited to a practical application when the method, as claimed, produces a concrete, tangible and useful result; i.e., the method recites a step or act of producing something that is concrete, tangible and useful. See *AT&T*, 172 F.3d at 1358, 50 USPQ2d at 1452. Likewise, a machine claim is statutory when the machine, as claimed, produces a concrete, tangible and useful result (as in *State Street*, 149 F.3d at 1373, 47 USPQ2d at 1601) and/or when a specific machine is being claimed (as in *Alappat*, 33 F.3d at 1544, 31 USPQ2d at 1557 (in banc). For example, a computer process that simply calculates a mathematical algorithm that models noise is nonstatutory. However, a claimed process for digitally filtering noise employing the mathematical algorithm is statutory.
> Examples of this type of claimed statutory process include the following:...

> A digital filtering process for removing noise from a digital signal comprising the steps of calculating a mathematical algorithm to produce a correction signal and subtracting the correction signal from the digital signal to remove the noise.

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Just as it is clear that the example claim quoted above is limited to application in the technological arts, applicant respectfully submits that it is clear that Applicant's claims limit themselves to methods of updating and/or manipulating an unsorted hierarchically-organized data structure. Collapsing nodes as recited in claims 1 and 29, and associating identifiers with nodes as recited in claim 18, produces a concrete, tangible, useful result that applies to identifying equivalent portions of unsorted hierarchically-organized data structures.

The Office rejects claims 33 and 34 because of the term "wireless." However, claim 33 recites a computer program product encoded in at least one computer readable medium. The term "wireless" appears in claim 34, not claim 33. Claim 34 has been amended to remove the term "wireless."

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Rejections under 35 U.S.C. §103(a)

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All of the references of record relied upon by the Office, whether standing alone or in combination, fail to disclose or suggest at least Applicant's claims for at least one of the following reasons, some of which have been repeatedly stated in the responses and in the Appeal Brief previously filed:

1) there is no disclosure or suggestion of orthogonal encodings as recited in the claims and the Office again fails to address this limitation;

2) the art of record still discloses ordering nodes and alphabetically ordered node values in direct contrast to recitation in the claims of order-insensitive collapsing; and

3) the art of record discloses concatenating leaf node identifier values to identify an internal node, but does not disclose or suggest a current node's identifier including the current node contribution and contribution associated with any child nodes thereof as recited in the claims.

Aggarwal in view of Jeyaraman

Claims 1, 2, 5, 14, and 15 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,781,906 granted to Aggarwal et al. (Aggarwal) in view of U.S. Patent No. 6,311,187 granted to Jeyaraman (Jeyaraman). Applicant traverses these rejections. **The Office**

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asserts that Aggarwal discloses order-insensitive collapsing because the leaf node values are not ordered from left to right, however those values are ordered alphabetically from right to left. Regardless of the direction of the ordering, Aggarwal still discloses alphabetical ordering of node values when compressed. When nodes are compressed as disclosed in Aggarwal, the alphabetical ordering is maintained (e.g., AB, ABC, and DF). *See* Figure 7; col. 8, lines 17 – 38. In addition, Aggarwal specifically states that "nodes A through F are non-leaf nodes, ordered by breadth-first search...." Col. 8, lines 22 – 24. Thus, Aggarwal fails to disclose or suggest "wherein the collapsing is order-insensitive with respect to information of the respective child nodes" as recited in claim 1. ·

Claim 1 also recites "identifying the respective portions as equivalent" based on correspondence of particular instances of the collapsed representations." Aggarwal fails to disclose identifying equivalent portions, so the Office relies upon Jeyaraman's disclosure of matching leaf nodes. However, the combination of Aggarwal's collapsing internal nodes 'A' and 'B' to form internal node 'AB', and Jeyaraman's matching leaf nodes, still fails to disclose or suggest identifying equivalent portions based on correspondence of collapsed representations. The Office simply states that Aggarwal would use Jeyaraman's leaf matching to "eliminate the need for a separate time-consuming pass through the data to create update from different and improve searching nodes on a tree quickly." However, Jeyaraman's matching is performed prior to the collapse operation. Disclosure by Jeyaraman to match leaf nodes prior to collapsing nodes does not motivate or suggest modifying Aggarwal to identify equivalent portion's of Aggarwal's trees based on the compressed identifiers subsequent to compression. Neither of the references, standing alone or in combination, discloses or suggests matching based on collapsed representations.

To reject claim 2, the Office again passes over recitation of "the collapsed representations include respective aggregations of orthogonally-encoded child node information." The Office states that "a tree may represent a document consisting of section, paragraphs and individual sentences containing parsable character data." Applicant respectfully submits that representing a document does not disclose or suggest aggregations of orthogonally-encoded child information. Sections, paragraphs and sentences are not orthogonal. The Office has never found

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and still cannot find any disclosure or suggestion of orthogonally-encoded child information as recited in the claims.

When rejecting claim 5, the Office again interprets the claim without giving any patentable weight to orthogonal. Claim 5 recites "wherein the order insensitive collapsing includes an arithmetic sum of orthogonal binary encodings of child node information." The Office bases the rejection on Aggarwal's disclosure of branch factors and skew factors employed in construction of an index tree. A sum of areas as disclosed in Aggarwal is not a sum of orthogonal binary encodings of child node information. The areas of the rectangles are not orthogonal binary encodings.

Aggarwal in view of Jeyaraman and further in view of Brown

Claims 6, 7, 12, 13, and 17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Aggarwal in view of Jeyaraman and further in view of U.S. Patent No. 6,539,369 granted to Brown (Brown). Claims 33 – 34 are rejected under 35 U.S.C. §103(a) as being unpatentable over Jeyaraman in view of Aggarwal and Brown. Claims 35 – 36 are rejected under 35 U.S.C. §103(a) as being unpatentable over Aggarwal in view of Brown.

Claims 6, 20, 13 and 17

The Office rejects claims 6 and 20 based on Brown's disclosure levels of a binary tree mapped to mappers. Claim 6 recites "distinct tables are defined for each level of the hierarchically-organized data structure." Claim 20 recites "wherein the orthogonally-encoded mappings at each level of the tree-oriented data representation are in accordance with a corresponding level-specific table." In clear contrast, Brown discloses "the 32 levels of the binary tree are divided into three mapper levels 112a – c...." Col. 5, lines 50 – 56. If a table can be interpreted to encompass a mapper as disclosed by Brown, then Brown discloses a first table being defined for 16 levels, and a second and a third tables being respectively defined for the last two groups of 8 levels. *See* col. 5, lines 55 – 61. Hence, Brown clearly does not disclose distinct tables being defined for each level.

The Office rejects claim 13 with the assertion that it would have been obvious to "apply Brown's teaching of the pointer index is the sum of the base address 42, the code word offset 46a

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and the 4-bit offset 54 to Jeyaraman's system in order to allow search/retrieve data without need for a sequential search through the collection of elements." Claim 13 recites "wherein the order-insensitive collapsing includes an arithmetic addition of orthogonally-encoded values that index into a store of child node information." Applying the sum of a base address, code word offset, and a 4-bit offset to Jeyaraman does not disclose or suggest the recited limitation of claim 13. Although Brown discloses a sum, the sum is not of orthogonally-encoded values that index into a store of child node information. The base address, code word offset, and 4-bit offset as disclosed in Brown are not orthogonally-encoded values.

The rejection of claim 17 seems to completely disregard the limitations. Claim 17 recites "wherein the hierarchically-organized data structure encodes subassembly information as sub-hierarchies thereof and encodes component parts at least at leaf nodes thereof." The Office simply states that it would have been obvious to "apply Brown's teaching of tree encodes information on its nodes to Aggarwal's system in order to find a value corresponding to the search key effiencelty [sic] during searching/retrieving." The Office merely refers to encoding and completely ignores the rest of claim 17. Indeed, it is clear error to ignore limitations clearly set forth in the claims. *Panduit Corp.*, 1 U.S.P.Q.2d, 1603 – 1604, 810 F.2d at 1576. The Office does not assert that each and every limitation is found in the references, and has thus has not established a *prima facie* case of obviousness. There is no disclosure or suggestion of a data structure encoding subassembly information as sub-hierarchies and encoding component parts at leaf nodes thereof.

Claim 33

To reject claim 33, the Office refers to Aggarwal as disclosing order-insensitive collapsing. As stated above, Aggarwal specifically states and depicts the collapsing being sensitive to order. The rejection of claim 33 also ignores the limitation of orthogonal encodings. As already stated, none of the references of record disclose or suggest orthogonal encodings as recited in the claims.

Claim 35 and 36

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The Office refers to Aggarwal's disclosure of collapsing a node 'A' and 'B' to form node 'AB' when rejecting claim 35. However, claim 35 recites "collapsing plural nodes of the hierarchically-organized data structure into respective representations that each incorporate information of a respective node and that of any child nodes thereof." The internal node in Aggarwal is only identified with values of the child leaf nodes. There is no disclosure in Aggarwal of incorporating information from both the respective node and the child nodes thereof. In addition, neither Aggarwal nor Brown disclose or suggest "wherein the collapsing includes an order-insensitive aggregation of orthogonal encodings of information of the respective child nodes" as recited in claim 35. As already stated, Aggarwal discloses alphabetical order (e.g., 'A' and 'B' → 'AB'). The Office recognizes that Aggarwal does not disclose or suggest orthogonal encoding, and then states that "Brown teaches values for multiple subtree leaves are encoded in the node descriptor." Encoding values in a node descriptor does not disclose or suggest orthogonal encodings. The Office either erroneously construes, or ignores the term "orthogonal."

With regard to claim 36, the Office asserts that applying Jeyaraman's matching phase to Aggarwal's system makes claim 36 obvious to one of ordinary skill in the art. Claim 36 recites "matching instructions executable by the one or more processors to identify distinct sub-hierarchies of the hierarchically-organized data structure as at least equivalent based on correspondence of the collapsed representations." There is no motivation or suggestion to match collapsed nodes of Aggarwal based on the collapsed representations. Jeyaraman cannot provide such motivation because Jeyaraman discloses collapsing nodes after leaf nodes have been matched. Aggarwal does not disclose or suggest matching of compressed nodes. Hence, there is no disclosure or suggestion of identifying equivalent portions of a hierarchically-organized data structure based on collapsed representations of nodes.

Aggarwal in view of Fenger

Claims 18 – 28 are rejected under 35 U.S.C. §103(a) as being unpatentable over Jeyaraman in view of Aggarwal in view of U.S. Patent No. 6,751,659 granted to Fenger et al. (Fenger).

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Claim 18 recites "at each next level of the tree, associating an identifier with each node thereof, each such identifier including a current node contribution and a contribution associated with any child nodes thereof." The Office refers to the tree depicted in Figure 6A of Jeyaraman to assert that "the identifier of the right Se has to include P node and all children nodes of P." However, there is no support for this assertion by the Office. The Figure 6A does not indicate any identifier for Se except Se, and the section cited by the Office simply states that the data conforms to HMTL or XML. There is no disclosure or suggestion in Jeyaraman of an identifier including contribution from the current node and any child nodes thereof. In fact, Jeyaraman states that "the identity of each internal node is established by the collective identify of its children." Col. 11, lines 20 – 22. From Figure 6A, it can easily be seen that the internal node is identified solely by child leaf node values thereof.

Claim 18 also recites "wherein the identifiers and combining function are selected to ensure that same combinations of child node identifiers result in same child node contributions irrespective of ordering of the child node identifiers." The contribution of child nodes as disclosed in Jeyaraman has already been explained as order-sensitive. The rejection of claim 18 also refers to col. 12, lines 1 – 5, but no such column exists in Fenger. The Office refers to Fenger as disclosing a sort tree. *See* p. 14 of Rejection of 6 July 2005. Applicant respectfully submits that Jeyaraman in view of a sort tree as disclosed by Fenger does not disclose or suggest claim 18.

Claims 19 and 24 are rejected based on Jeyaraman. To reject these claims, the Office merely quotes the claims and states that Jeyaraman teaches the claimed limitation. However, as already discussed, Jeyaraman never discloses or suggests orthogonal encodings. Jeyaraman discloses concatenating the leaf node values together to identify a parent node of the leaf nodes. Jeyaraman has no disclosure or suggestion of the identifiers being "orthogonally-encoded mappings of respective string encodings of the current node contribution concatenated with respective orthogonally-encoded mappings of child node information orthogonally" as recited in claim 19. Jeyaraman also fails to disclose or suggest "wherein, at least at any particular level of the tree-oriented data representation, the identifiers are orthogonally-encoded" as recited in claim 24.

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Claims 20 and 23 are rejected for the same rationale as claim 6. As stated above, Brown clearly discloses multiple levels of a binary tree being mapped to a mapper. Claim 20 recites "wherein the **orthogonally**-encoded mappings at **each level of the tree-oriented data representation** are in accordance with a corresponding **level-specific table**." Claim 23 recites "wherein the **orthogonally**-encoded hashes for **each level** of the tree-oriented data representation are in accordance with a **single corresponding table**."

To reject claim 25, the Office relies on the concatenation of A to B in Aggarwal and disclosure of node addresses in Brown. However, the node addresses disclosed in Brown are not orthogonal encodings of binary integers. Regardless of whether the concatenation by Aggarwal can be characterized as addition, the addresses in Brown are not added together. There is no motivation or suggestion to replace the identifiers A and B in Aggarwal with node addresses from Brown. Even so, the references still fail to disclose or suggest orthogonal encodings of binary integers.

Jeyaraman in view of Benson

Claims 29 – 32 are rejected under 35 U.S.C. §103(a) as being unpatentable over Jeyaraman in view of U.S. Patent No. 5,940,833 granted to Benson (Benson). Claim 41 is rejected under 35 U.S.C. §103(a) as being unpatentable over Jeyaraman in view of Benson.
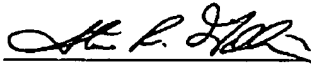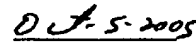
The Office states "that Jeyaraman teaches the claimed limitation of 'representing any given node of the hierarchically-organized data as a concatenation of node-specific information with a combination of the orthogonal values for each collapsed sub-hierarchy therebeneath'", which is recited in claim 29. As stated above with respect to claim 18, Jeyaraman discloses identifying a parent node with the collective identities of its child leaf node values. There is no disclosure or suggestion in Jeyaraman of the recited limitation. The Office then refers to Benson for disclosure of recursive encoding. However, once again, the Office fails to identify any disclosure or suggestion of orthogonal values as recited in claim 29. None of the references of record disclose or suggest encodings that include orthogonal values as recited in the claims.

With regard to claim 41, the Office repeats the same mistakes and fails to identify any disclosure or suggestion of orthogonal encodings or element order independent comparison.

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Claim 41 specifically recites "means for performing an element order independent comparison of hierarchically organized data structures using a transformation operation that orthogonally and recursively encodes child node information." As already stated above, Jeyaraman is not order independent. Jeyaraman uses swap operations to restore order of nodes in the tree as disclosed throughout Jeyaraman (col. 13, lines 4 – 9; col. 13, lines 15 – 19; col. 13, lines 25 – 28; col. 14, lines 22 – 25). Even the assignment of node identifiers is order sensitive as seen in Figures 6H – 6J, which depict the node identifiers as exactly reflecting order of the children nodes as they occur in the tree. The Office then refers to Benson as disclosing recursive encoding, but again the Office ignores the appearance of "orthogonally" in claim 41. The Office does not assert that Jeyaraman or Benson, standing alone or in combination, discloses or suggests orthogonally encoding as recited in claim 41. Applicant respectfully submits that none of the art of record discloses or suggests orthogonal encodings as found in the claims.

In summary, claims 1-41 are in the case. All claims are believed to be allowable over the art of record, and a Notice of Allowance to that effect is respectfully solicited. Nonetheless, if any issues remain that could be more efficiently handled by telephone, the Examiner is requested to call the undersigned at the number listed below.

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